Record of Modification

Phase 1 Site Characterization Sampling and Analysis Plan Field Activities
Columbia Fall Aluminum Company RI/FS
Phase 1 SAP MOD #11

Instructions to Requester: **Submit to Roux RI Manager or Roux RI/FS Project Manager**
Roux RI Manager will maintain legible copies in a binder that can be accessed by personnel.

Project Work Plan/QAPP (check one)**:**

[X] 2015 Phase 1 SAP

[ ] SOP (Title, # and approval date): _____

Requester: Michael Ritorto, RI Manager Date: June 12, 2017

Applicable section of SAP/SOP:

There is not an applicable section of the SAP/SOP because Slug Testing was not discussed in the Phase I SAP.

Description of Modification:

Roux Associates will complete slug tests at monitoring wells distributed across the Site. Pneumatic slug tests will be conducted on the new 2-inch diameter wells installed as part of the Phase I Site Characterization. For a pneumatic test to be conducted, the entire length of screen of the monitoring well must be submerged beneath the level of standing water in well. Mechanical slug tests will be conducted on the newly installed wells with partially submerged screens. Based upon water levels measured in July and August 2016, it is anticipated that approximately 38 of the 44 newly installed wells will be tested using the pneumatic method, and 6 of the 44 newly installed wells will be tested using the mechanical method; however, the final determination of wells to be tested will be made based upon water levels at the time the testing is to be performed.

Pneumatic slug tests will be conducted within the casing of each well using compressed air as the displacing (slug) volume. The water column within the well casing will be depressed by increasing the air pressure in the casing above the water column. When the water level is depressed to a predetermined level and the air pressure stabilized within the test interval, the air pressure within the well casing will be rapidly released. The instantaneous release of air pressure from the well casing will initiate a pneumatic slug withdrawal test, which will be recorded using a pressure transducer and a data logger. All tests will be conducted in accordance with the procedures outlined in the SOP titled "Standard Operating Procedure 4.8 for Conducting a Pneumatic Slug Test."

Mechanical slug tests will be conducted within the casing of each well using a solid cylinder (slug). Due

to the fact that mechanical slug tests are being performed on water table wells, the testing will be limited to "slug-out" tests. As part of the "slug-out test", the water column within the well casing will be decreasing by rapidly removing the solid slug from the water column. All changes in water levels will be recorded using a pressure transducer and a data logger. All tests will be conducted in accordance with the procedures outlined in the SOP titled "Standard Operating Procedure 4.9 for Conducting a Mechanical Slug Test."

At each location, the test will be conducted with an approximate 1-foot displacement. The test will be repeated at each well using 1-foot displacement to determine the reproducibility of the data. If water levels return to static or near static conditions within one hour, another test will be conducted using an approximate 2-foot displacement.

Data analysis to determine hydraulic conductivity values for each test will be performed using a combination of Excel, Aqtesolv or Geoprobe Slug Test Analysis software, and Win-Situ software. Following completion of testing and analysis, a report will be prepared to describe the tests and the data evaluation methods, and to summarize the test results. All data analysis procedures, including decision making processes, will be conducted in accordance with the procedures outlined in the SOP titled "Standard Operating Procedure 4.10 for "Analyzing Slug Test Data."

Rationale for Modifications / Potential Implications of Modifications:

The slug testing program will be performed to evaluate the *in situ* permeability contrast between various hydrogeologic units beneath the site. The slug tests will generate data that will be used to determine the hydraulic conductivity at each well as part of the ongoing Phase I Site Characterization program. The hydraulic conductivity data from each tested well will be added to the overall Phase I Site Characterization dataset and used for evaluation of groundwater flow beneath the Site.

Duration of Modification (Check one):

☐ Temporary
Date(s) _____
Sample Numbers _____

☒ Permanent (Proposed Text Modification Section) June 12, 2017
Effective Date:

Proposed Text Modifications in Associated Document:

This form serves to document the change as described above, no document revisions are proposed.

Data Quality Indicator (check one) – Please reference definitions on next page for direction on selecting data quality indicators:

☐ **Not Applicable** ☐ **Reject** ☐ **Low Bias** ☐ **Estimate** ☐ **High Bias** ☒ **No Bias**

Roux Project Manager Approval: Michael Ritorto Date: June 12, 2017

(Roux RI/FS Project Manager or designate)

EPA Review and Approval: Mike Cirian Date:

(USEPA RPM or designate)

DATA QUALITY INDICATOR DEFINITIONS

Reject – Samples associated with this modification form are not useable. The conditions outlined in the modification form adversely affect the associated sample to such a degree that the data are not reliable.

Low Bias – Samples associated with this modification form are useable, but results are likely to be biased low. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated low.

Estimate – Samples associated with this modification form are useable, but results should be considered approximations. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimates.

High Bias – Samples associated with this modification form are useable, but results are likely to be biased high. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated high.

No Bias – Samples associated with this modification form are useable as reported. The conditions outlined in the modification form suggest that associated sample data are reliable as reported.